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- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AL, AU, BA, BR, CA, CN, CO, DZ, EC, EG, GE, HR, ID, IL, IN, IS, JP, KR, LT, LV, MA, MK, MX, NO, NZ, PH, PL, SG, TN, UA, VN, YU, ZA, ZW, Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR)
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(54) Title: **PROCESS FOR PREPARING (S)-PANTOPRAZOLE** ✓

(57) Abstract: The invention relates to a novel process for preparing (S)-pantoprazole using a chiral zirconium complex or a chiral hafnium complex.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07D401/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 96/02535 A (COTTON HANNA KRISTINA ; LARSSON ERIK MAGNUS (SE); ASTRA AB (SE); SOERE) 1 February 1996 (1996-02-01) cited in the application examples 23,24	1-6, 10-15
X	example 23	20
Y	BONCHIO M ET AL: "The first Chiral Zirconium(IV) catalyst for highly stereoselective sulfoxidation" JOURNAL OF ORGANIC CHEMISTRY, AMERICAN CHEMICAL SOCIETY, EASTON, US, vol. 64, no. 4, 1999, pages 1326-1330, XP002242676 ISSN: 0022-3263 page 1327, scheme 2 page 1329, column 2, line 16 - page 1330, column 1, line 3	1-6, 10-15
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *G* document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/13604

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 92/08716 A (BYK GULDEN LOMBERG CHEM FAB) 29 May 1992 (1992-05-29) cited in the application examples 1-4	1,2
X	example 4	20
X	----- WO 94/24867 A (SEPRACOR INC) 10 November 1994 (1994-11-10) cited in the application abstract page 2, line 7 - line 12	20
A	----- WO 94/25028 A (SEPRACOR INC) 10 November 1994 (1994-11-10) cited in the application page 2, line 7 - line 12	20
A	----- WO 99/47514 A (KNOLL AG ; BRENNAN JAMES PATRICK (GB); TURNER ANDREW TIMOTHY (GB)) 23 September 1999 (1999-09-23) examples 1,5	1,2
A	----- WO 96/17076 A (ASTRA AB ; HOLT ROBERT (GB); LINDBERG PER (SE); REEVE CHRISTOPHER (GB)) 6 June 1996 (1996-06-06) cited in the application page 5 page 7 page 13, line 15 - page 15, line 9	1,2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/13604

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9602535	A	01-02-1996	SE 504459 C2 AT 242233 T AU 688074 B2 AU 2994895 A BR 9508292 A CA 2193994 A1 CN 1157614 A , B CZ 9700064 A3 DE 69530987 D1 DE 69530987 T2 DK 773940 T3 EE 3354 B1 EP 0773940 A1 ES 2199998 T3 FI 970102 A HK 1008331 A1 HR 950401 A1 HU 76642 A2 IL 114477 A JP 10504290 T MA 23611 A1 NO 970153 A NZ 289959 A PL 318165 A1 PT 773940 T RU 2157806 C2 SE 9402510 A WO 9602535 A1 SI 773940 T1 SK 4897 A3 TR 960063 A2 US 5948789 A ZA 9505724 A	17-02-1997 15-06-2003 05-03-1998 16-02-1996 23-12-1997 01-02-1996 20-08-1997 11-06-1997 10-07-2003 19-05-2004 15-09-2003 15-02-2001 21-05-1997 01-03-2004 10-01-1997 21-11-2003 31-10-1997 28-10-1997 24-07-2001 28-04-1998 01-04-1996 14-01-1997 26-01-1998 26-05-1997 31-10-2003 20-10-2000 16-01-1996 01-02-1996 29-02-2004 06-08-1997 21-06-1996 07-09-1999 15-01-1996
WO 9208716	A	29-05-1992	DE 4035455 A1 AU 8840691 A WO 9208716 A1	14-05-1992 11-06-1992 29-05-1992
WO 9424867	A	10-11-1994	AU 6713194 A AU 6904498 A CA 2161256 A1 EP 0695123 A1 JP 8509736 T WO 9424867 A1 US 2003086968 A1 US 2004142032 A1 US 5888535 A US 2001008899 A1	21-11-1994 16-07-1998 10-11-1994 07-02-1996 15-10-1996 10-11-1994 08-05-2003 22-07-2004 30-03-1999 19-07-2001
WO 9425028	A	10-11-1994	AU 6713394 A CA 2161130 A1 EP 0700292 A1 JP 8509738 T WO 9425028 A1 US 2002019420 A1	21-11-1994 10-11-1994 13-03-1996 15-10-1996 10-11-1994 14-02-2002
WO 9947514	A	23-09-1999	AU 3410699 A BR 9908835 A	11-10-1999 21-11-2000

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/13604

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9947514	A	CA 2323422 A1	23-09-1999
		CN 1293670 T	02-05-2001
		WO 9947514 A1	23-09-1999
		EP 1071678 A1	31-01-2001
		HU 0101230 A2	28-10-2001
		JP 2002506862 T	05-03-2002
		NO 20004580 A	14-09-2000
		SK 13452000 A3	09-04-2001
		TR 200002670 T2	21-11-2000
		TW 473476 B	21-01-2002
WO 9617076	A	06-06-1996	
		AT 232907 T	15-03-2003
		AU 699577 B2	10-12-1998
		AU 4126996 A	19-06-1996
		CA 2203999 A1	06-06-1996
		DE 69529686 D1	27-03-2003
		DE 69529686 T2	15-01-2004
		DK 795024 T3	22-04-2003
		EP 0795024 A1	17-09-1997
		ES 2191066 T3	01-09-2003
		JP 10510705 T	20-10-1998
		WO 9617076 A1	06-06-1996
		US 5840552 A	24-11-1998